

WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device comprising a semiconductor substrate including semiconductor elements, and multi-layered wiring regions, wherein at least one layer of the wiring regions above the first wiring region on the semiconductor substrate is fabricated using a process comprising the following steps (a) to (f):

- (a) a step of forming a via-hole in an interlayer dielectric formed above the first wiring region on a semiconductor substrate;
- (b) a degassing step for removing gaseous components included within said interlayer dielectric by a heat treatment under reduced pressure and at the substrate temperature of 300°C to 550°C;
- (c) a step of forming a wetting layer on the surface of said interlayer dielectric;
- (d) a step of cooling the substrate to a temperature of no more than 100°C;
- (e) a step of forming a first aluminum layer comprising one of aluminum and an alloy in which aluminum is the main component on said wetting layer at a temperature of a first degree C;
- (f) a step of forming a second aluminum layer comprising one of aluminum and an alloy in which aluminum is the main component on said first aluminum layer at a temperature of a second degree C; and wherein the first degree C is lower than the second degree C.

2. A method of fabricating a semiconductor device comprising a semiconductor substrate including semiconductor elements; and multi-layered wiring regions, wherein at least one layer of the wiring regions above the first wiring region on the semiconductor substrate is fabricated using a process comprising the following steps (a) to (f):

- (a) a step of forming an interlayer dielectric formed above the first wiring region on a semiconductor substrate;
- (b) a degassing step for removing gaseous components included within said interlayer dielectric by a heat treatment under reduced pressure and at the substrate temperature of 300°C to 550°C;
- (c) a step of forming a wetting layer on the surface of said interlayer dielectric;
- (d) a step of cooling the substrate to a temperature of no more than 100°C;
- (e) a step of forming a first aluminum layer comprising one of aluminum and an alloy in which aluminum is the main component on said wetting layer at a temperature of a first degree C; and
- (f) a step of forming a second aluminum layer comprising one of aluminum and an alloy in which aluminum is the main component on said first aluminum layer at a temperature of a second degree C; and wherein the first degree C is lower than the second degree C.

3. The method of fabricating a semiconductor device according to claim 1, wherein the first degree C is no more than 200°C and the second degree C is at least 300°C.

4. The method of fabricating a semiconductor device according to claim 2, wherein the first degree C is no more than 200°C and the second degree C is at least 300°C.

5. The method of fabricating a semiconductor device according to claim 3, wherein the formation of the aluminum layers in said steps (e) and (f) is provided by a sputtering method.

6. The method of fabricating a semiconductor device according to claim 3, wherein the formation of the aluminum layers in said steps (e) and (f) is provided in the same chamber and in a consecutive manner.

7. The method of fabricating a semiconductor device according to claim 3, wherein said steps (d), (e), and (f) are performed consecutively in the same equipment having a plurality of chambers each maintained under a reduced pressure.

8. The method of fabricating a semiconductor device according to claim 3, wherein the formation of the aluminum layers in said steps (e) and (f) is provided by controlling the temperature of the stage on which said semiconductor substrate is to be mounted.